IASbaba 60 Day plan 2020 – Day 59 Science and technology

Q.1) Consider the following statement(s) with regard Indian Data Relay Satellite System (IDRSS) –

1. It enabling satellite to satellite communication and transfer of data.
2. IDRSS satellites will be placed in geostationary orbit.
3. India will be the third country to have Data Relay Satellite System.

Select the correct option –

a) 1 only
b) 1 and 2 only
c) 1 and 3 only
d) All of the above

Q.1) Solution (b)

India plans for its own space-to-space tracking and communication of its space assets this year by putting up a new satellite series called Indian Data Relay Satellite System (IDRSS).

About IDRSS

- A set of 2 IDRSS satellites will be placed in **geostationary orbit**, enabling **satellite to satellite communication** and transfer of data.
- It will track, send and receive real-time information from other Indian satellites, in particular those in low-earth orbits (LEO) which have limited coverage of earth.
- It will also be useful in monitoring launches and benefitting crew members of the Gaganyaan mission ensuring mission control throughout their travel.
- It is also significant for space docking, space station, as well as distant expeditions to moon, Mars and Venus.
- It will also reduce the dependence on the ground stations in tracking satellites.
- First satellite will be launched by 2020 end and second one by 2021.
- **India will join US, China, Japan and Europe who already have such DRS systems.**

Q.2) "This type of computing means taking real-time decisions close to the source of data. By locating computational intelligence close to the individual and different sources of the data, it reduces latency in the implementation of a requested service. Instead of sending data through the entire core network to the cloud for processing, it uses a distributed network architecture to ensure near-real-time processing with reduced delays, which would otherwise simply not be acceptable for the specific service."

Which technology has been depicted in the above paragraph?

a) Cloud Computing

b) Quantum Computing
c) Edge Computing
d) Nano computing

Q.2) Solution (c)

The word edge in this context means literal geographic distribution. Edge computing is computing that's done at or near the source of the data, instead of relying on the cloud at one of a dozen data centers to do all the work. It doesn't mean the cloud will disappear. It means the cloud is coming to you.

Edge computing enables data to be analyzed, processed and transferred at the edge of a network. The basic difference between edge computing and cloud computing lies in where the data processing takes place. In Edge computing, The idea is to analyze data locally, closer to where it is stored, in real-time without latency, rather than send it far away to a centralized data centre.

So whether you are streaming a video on Netflix or accessing a library of video games in the cloud, edge computing allows for quicker data processing and content delivery. Hence statement 1 is correct.

At the moment, the existing Internet of Things (IoT) systems performs all of their computations in the cloud using data centers. Edge computing, on the other hand, essentially manages the massive amounts of data generated by IoT devices by storing and processing data locally. That data doesn't need to be sent over a network as soon as it processed; only important data is sent — therefore, an edge computing network reduces the amount of data that travels over the network.

Q.3) Consider the following pairs –

Satellite	**Function**
1. RISAT	Can take pictures of the earth during day and night and also under cloudy conditions.
2. GISAT-1	Continuous observation of Indian subcontinent from Geostationary orbit.
3. XPoSat	dedicated mission to study polarisation

Which of the above has been correctly matched?

a) 1 only
b) 1 and 3 only
c) 3 only
d) All of the above

Q.3) Solution (d)

The RISAT satellites are equipped with a Synthetic Aperture Radar (SAR) that can take pictures of the earth during day and night and also under cloudy conditions.

RISAT-2BR1 is the second radar imaging satellite in the RISAT-2B series and along with the CARTOSAT-3 is part of a group of satellites that will boost India's earth imaging capabilities from space.

The satellite will help in agriculture, mining, forestry and coastal management, soil monitoring, disaster management support and round the clock border surveillance.

In the past decade, ISRO has launched two satellites in the RISAT series, beginning in 2009 with the Israeli-built RISAT 2, and the second one, RISAT 1, in 2012. The RISAT 1 is no longer operational.

Risat-2 is a military satellite which was fast tracked after the Mumbai terrorist incident to boost surveillance capabilities of security forces.

Geo Imaging Satellite (GISAT-1)

- It is planned Indian earth observing satellite to facilitate continuous observation of Indian subcontinent, quick monitoring of natural hazards and disaster.
- It will be the first of two planned Indian Earth Observatory spacecraft to be placed in a geostationary orbit of around 36,000 km.

XPoSat

- X-ray Polarimeter Satellite, is a planned dedicated mission to study polarisation.
- The spacecraft will carry Polarimeter Instrument in X-rays (POLIX) payload which will study the degree and angle of polarisation of bright X-ray sources in the energy range 5-30 keV.
- The satellite has a mission life of five years and will be placed in circular 500-700km orbit
- It will study neutron stars, supemova remnants, pulsars and regions around black holes.

Q.4) Which of the following can be the application of gravitational lensing?

1. Study of very far-away galaxies

2. Study of dark matter
3. Understanding the star formation

Select the correct option –

a) 1 only
b) 1 and 2 only
c) 2 and 3 only
d) All of the above

Q.4) Solution (d)

Gravitational lensing

- It is a phenomenon, which occurs when a huge amount of matter, such as a massive galaxy or cluster of galaxies, creates a gravitational field that distorts and magnifies the light from objects behind it, but in the same line of sight.
- These large celestial objects will magnify the light from distant galaxies that are at or near the peak of star formation. So, in a way these objects act as natural, cosmic telescopes and are called gravitational lenses.
- As a result, the galaxies appear much, much brighter than they actually are, because they've been highly magnified up to 50 times.

Applications of Gravitational Lensing

- Study the galaxies, which are very far away and can't be seen otherwise with even the most powerful space telescopes.
- Observe invisible things in the Universe- since dark matter doesn't emit or absorb light on its own, so it can't be observed directly. Using this effect, it can be worked out how much dark matter exists in the universe.
- Understand the star formation - by studying how those galaxies are forming their stars, and how that star formation is distributed across the galaxies.
- Understand the past- e.g. The Milky Way today forms the equivalent of one Sun every year, but in the past, that rate was up to 100 times greater. Using this effect, the scientists can look billions of years into the past in order to understand how our Sun formed.

Q.5) Which of the following correctly describes Ploonets recently in news?

a) Moons that are in gaseous state.
b) Ancient heavenly bodies which are theories to have signs of life.

c) Moons that have escaped the bonds of their parent planet and started orbiting their stars instead.
d) Moons that have escaped the bonds of their parent planet and started to exist as a separate planet.

Q.5) Solution (c)

Ploonets

- Recently a team of astronomers from Royal Astronomical Society have defined a new class of celestial objects called 'Ploonets'.
- Ploonets are the orphaned moons that have escaped the bonds of their parent planet and start orbiting their stars instead.
- Ploonets could help explain some bizarre exoplanetary features and can also provide details on planet formation processes.
- Astronomers concede, however, that Ploonets still remain hypothetical.

Q.6) Consider the following statements with regard to Global Innovation & Technology Alliance –

1. It is operated as a Public Private Partnership.
2. It is headed by Finance secretary.

Select the correct option –

a) 1 only
b) 2 only
c) Both 1 and 2
d) None of the above

Q.6) Solution (a)

A Public Private Partnership (PPP) between Technology Development Board (TDB), Department of Science & Technology (DST), Government of India (GoI) and India' s apex industry association Confederation of Indian Industry (CII).

GITA is now working with 8 countries and adding further energy, momentum and scale. The projects were from a range of areas including smart transport management to biomedical technologies and smart water quality monitoring solutions.

It has provided an enabling platform for frontline techno-economic alliances.

Enterprises from India are tying up with their counterparts from partner countries including Canada, Finland, Italy, Sweden, Spain, and the UK.

This industry-led collaboration, with the government as an equal partner, is aimed at supporting the last phase of technology-based high-end, affordable product development which can connect to both global and domestic markets.

Technology Acquisition and Development Fund (TADF) to facilitate Micro, Small & Medium Enterprises (MSME) to acquire clean, green and energy efficient technologies is implement through GITA. India improved its rank on the Global Innovation Index for the fourth year consecutively. From being ranked at the 81st position in 2015, India improved its ranking steadily to reach 52nd position in 2019. GITA, has been able to successfully engage in implementation of bilateral industrial R&D collaboration with some of the most innovative nations of the world including Canada, Finland, Israel, Italy, Korea, Spain, Sweden and the UK.

Q.7) Which of the above is incorrect about OSIRIS-Rex mission?

a) It is NASA's first mission to study an asteroid.
b) It is part of NASA's New Frontiers program.
c) It has orbiter, lander and rover as mission components.
d) None of the above

Q.7) Solution (a)

OSIRIS-REx

- NASA's OSIRIS-REx will be the **first mission to bring an asteroid sample to Earth.**
- OSIRIS-REx is the third mission in NASA's New Frontiers program, which previously sent the ***New Horizons*** spacecraft zooming by Pluto and the ***Juno spacecraft*** into orbit around Jupiter.
- The spacecraft is currently orbiting near-Earth asteroid, Bennu, and will spend two years mapping it before collecting a sample and returning to Earth.
- Bennu is a potentially hazardous asteroid that could one day threaten Earth.
- ***Nightingale***, OSIRIS-REx's primary sample collection site, is located within a crater in Bennu's northern hemisphere.

Q.8) Indigenously built Typbar TCV is the world's first clinically proven conjugate Typhoid vaccine. Consider the following statement regarding this –

1. It is basically a Polysaccharide linked to a carrier protein to create more powerful combined immune response.
2. Its single dose gives life-long immunity.

Select the correct option –

a) 1 only
b) 2 only
c) Both 1 and 2
d) None of the above

Q.8) Solution (a)

Hyderabad-based Bharat Biotech has developed a typhoid vaccine (Typbar TCV) which has better efficacy (82% protection) than the previously used vaccinations in preventing typhoid fever.

Typbar TCV

- Typbar TCV is the world's first clinically proven conjugate Typhoid vaccine. **Conjugate vaccines** are made using a combination of two different components. In Typbar TCV, an antigen is chemically linked to a carrier protein to create more powerful combined immune response.
- Currently, two typhoid vaccines viz. Polysaccharide Typhoid Vaccine and Live, Weakened Typhoid Vaccine are used in India
- The conjugate vaccine can be given to babies as young as six months, while the other two typhoid vaccines — polysaccharide typhoid vaccine and live, weakened typhoid vaccine cannot be given to children below two years of age.
- Its single dose is effective in preventing typhoid in children aged 9 months to 16 years.

Typhoid

- Typhoid fever is caused by food and water contaminated by Salmonella Typhi (S. Typhi) bacteria.
- It occurs predominantly in association with poor sanitation and lack of clean drinking water.
- The symptoms of the disease include fever, headache, nausea, loss of appetite, constipation and sometimes diarrhoea.
- According to the WHO, a large proportion of severe typhoid fever cases occur in children aged below two years.

Type of vaccine	How it is processed?	Diseases covered
Live attenuated vaccines	Live, attenuated vaccines contain a version of the living microbe that has been weakened in the lab so it can't cause disease.	Measles, mumps, rubella (MMR combined vaccine) Varicella (chickenpox) Influenza (nasal spray) Rotavirus
Inactivated vaccines	It is produce inactivated vaccines by killing the disease-causing microbe with chemicals, heat, or radiation.	Hepatitis A, Influenza, Pneumococcal polysaccharide
Sub-unit vaccine	Instead of the entire microbe, subunit vaccines include only the antigens that best stimulate the immune system.	Hepatitis B
Toxoid vaccines	Toxoid vaccines contain a toxin or chemical made by the bacteria or virus. They make a person immune to the harmful effects of the infection, instead of to the infection itself.	Diphtheria and tetanus
Polysaccharide Vaccines	Polysaccharide vaccines are a unique type of inactivated subunit vaccine composed of long chains of sugar molecules that make up the surface capsule of certain bacteria.	pneumococcal disease, meningococcal disease, and Salmonella Typhi
Biosynthetic vaccines	Biosynthetic vaccines contain manmade substances that are very similar to pieces of the virus or bacteria.	HIV

Q.9) Which of the following statements correctly describes the Elastocaloric effect?

a) Reversible thermal response to changes, induced by an applied electric field.
b) Cooling effect produced by twisting and untwisting of rubber bands.
c) Heating or cooling of materials under external pressure variation.
d) Energy released in a fuel or food by the complete combustion of a specified quantity of it.

Q.9) Solution (b)

In the elastocaloric effect, the transfer of heat works much the same way as when fluid refrigerants are compressed and expanded. When a rubber band is stretched, it absorbs heat from its environment, and when it is released, it gradually cools down. When rubber bands are twisted and untwisted, it produces a cooling effect. This is called the "elastocaloric" effect.

Background

- Refrigeration plays an important role in a wide range of human activity and keeping people and things cool consumes huge amounts of energy.
- They use fluids such as Hydrofluorocarbons which are susceptible to leakages, and can contribute to global warming.
- An alternative approach involves using "caloric" materials, which release heat when subjected to an external stimulus such as an applied magnetics or electric field or a compressive force. When the stimulus is removed, the material will absorb heat, thus cooling its surroundings.
- Recently, owing to the strong demand for efficient and environmentally friendly refrigeration technologies, materials with giant caloric effects, including elastocaloric, have been widely investigated.

Q.10) Consider the following statements regarding the National Supercomputing Mission:

1. It is joint Mission of Niti Aayog, Department of Science and Technology and Department of Electronics and Information Technology.
2. Under this Mission, supercomputers will also be networked on the National Supercomputing Grid over the National Knowledge Network (NKN).

Which of the statements given above is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q.10) Solution (b)

National Supercomputing Mission (NSM)

It is being implemented and steered jointly by the Department of Science and Technology (DST) and Department of Electronics and Information Technology (DeitY).

Implemented by the Centre for Development of Advanced Computing (C-DAC), Pune and the Indian Institute of Science (IISc), Bengaluru.

Focus of the mission:

- The Mission envisages empowering national academic and R&D institutions spread over the country by installing a vast supercomputing grid comprising of more than 70 high-performance computing facilities.

- These supercomputers will also be networked on the National Supercomputing grid over the National Knowledge Network (NKN). The NKN is another programme of the government which connects academic institutions and R&D labs over a high speed network.
- The Mission includes development of highly professional High Performance Computing (HPC) aware human resource for meeting challenges of development of these applications.

The first supercomputer assembled indigenously, called Param Shivay, was installed in IIT (BHU) and was inaugurated by the Prime Minister. Similar systems Param Shakti and Param Brahma were installed at IIT-Kharagpur and IISER, Pune. They are equipped with applications from domains like Weather and Climate, Computational Fluid Dynamics, Bioinformatics, and Material science.

Q.11) The Lunar Reconnaissance Orbiter (LRO), a multipurpose spacecraft to make a comprehensive atlas of the Moon's features and resources, was launched by which of the following organizations/ institutions?

a) ISRO
b) European Space Agency
c) NASA
d) SpaceX

Q.11) Solution (c)

Lunar Reconnaissance Orbiter (LRO):

- It is a NASA mission to the moon within the Lunar Precursor and Robotic Program (LPRP) in preparation for future manned missions to the moon and beyond (Mars).
- LRO is the first mission of NASA's `New Vision for Space Exploration'.
- The objectives of LRO are to:
    - Identify potential lunar resources.
    - Gather detailed maps of the lunar surface.
    - Collect data on the moon's radiation levels.
    - Study the moons polar regions for resources that could be used in future manned missions or robotic sample return missions.
    - Provide measurements to characterize future robotic explorers, human lunar landing sites and to derive measurements that can be used directly in support of future Lunar Human Exploration Systems

Q.12) With reference to recently announced National Guidelines for Gene Therapy, consider the following statements:

1. It seeks to regulate the gene therapy procedures in India.
2. It mandates registration of all clinical trials with Clinical Trials Registry-India (CTRI).
3. All entities producing gene therapy products must establish an Institutional Bio-safety Committee (IBSC).

Which of the statements given above are correct?

a) 1 and 2 only
b) 2 and 3 only
c) 1 and 3 only
d) 1, 2 and 3

Q.12) Solution (d)

National Guidelines for Gene Therapy Product Development and Clinical Trials

- The apex health research body ICMR has released national guidelines regarding the procedures to be followed for developing and performing gene therapies to tackle inherited genetic or rare diseases in India.
- The aim of the document is to ensure that gene therapies can be introduced in India and clinical trials for gene therapies can be performed in an ethical, scientific and safe manner.
- Cumulatively, approximately 70 million Indians suffer from some form of rare disease. These include hemophilia, thalassemia, sickle-cell anemia certain forms of muscular dystrophies, retinal dystrophies such as retinitis pigmentosa, corneal dystrophies, primary immunodeficiency (PID) in children, lysosomal storage disorders such as Pompe disease, Gaucher's disease, haemangioma, cystic fibrosis etc.
- These national guidelines provide the general principles for developing Gene Therapy Products (GTPs) any human ailment and provides the framework for human clinical trials which must follow the established general principles of biomedical research for any human applications
- The guidelines cover all areas of GTP production, pre-clinical testing and clinical administration, as well as long term, follow up.
- Mechanism for Review and Oversight:
    - Proposed establishment of Gene Therapy Advisory and Evaluation Committee (GTAEC)- an independent body with experts from diverse areas of biomedical research, government agencies and other stakeholders.
    - It is mandatory for all institutions and entities engaged in development of GTPs to establish an Institutional Bio-safety Committee (IBSC). Research involving development of new Gene Therapy Product (GTPs) needs to obtain approvals from IBSC and Ethics Committee (EC). Biological material from humans can be procured only from clinics/hospitals that have an Ethics Committee.

- All clinical trials are mandated to be registered with Clinical Trials Registry-India (CTRI). It is an online public record system for registration of clinical trials being conducted in India.

Q.13) Global Consortium for Digital Currency Governance is an initiative of –

a) European Union
b) G-20
c) World Bank
d) World Economic Forum

Q.13) Solution (d)

The World Economic Forum recently announced the first global consortium focused on designing a framework for the governance of digital currencies, including stable coins. The Global Consortium for Digital Currency Governance will aim to increase access to the financial system through innovative policy solutions that are inclusive and interoperable.

This is the first initiative to bring together leading companies, financial institutions, government representatives, technical experts, academics, international organizations, NGOs and members of the Forum's communities on a global level.

This consortium will focus on solutions for a fragmented regulatory system. Efficiency, speed, interoperability, inclusivity, and transparency will be at the heart of this initiative. It will call for innovative regulatory approaches to achieve these goals and build trust. A set of guiding principles will be codesigned to support public and private actors exploring the opportunities that digital currencies present.

This initiative builds on work done by the World Economic Forum over the past year, convening a global community of central banks to co-design a policy framework for the adoption of digital currencies called the Central Bank Digital Currency Toolkit.

Q.14) Consider the following statements with reference to NEST (New and Emerging Strategic technologies):

1. NEST will negotiate technology governance rules, standards and architecture, suited to India's conditions, in multilateral and plurilateral frameworks.
2. It is formed under the aegis of NITI Aayog

Which of the statements given above is/are correct?

a) 1 only
b) 2 only
c) Both 1 and 2
d) Neither 1 nor 2

Q.14) Solution (a)

The external affairs ministry recently announced the setting up of new, emerging and strategic technologies (NEST) division.

NEST will negotiate technology governance rules, standards, and architecture, suited to India's conditions, in multilateral and plurilateral frameworks. Hence statement 1 is correct.

The development comes close on the heels of the government allowing all network equipment makers, including Huawei, to participate in 5G trials.

NEST will act as the nodal division within the ministry for issues pertaining to new and emerging technologies.

NEST will negotiate technology governance rules, standards and architecture, suited to India's conditions, in multilateral and plurilateral frameworks.

It will help in collaboration with foreign partners in the field of 5G and artificial intelligence.

Its mandate shall include, but not be limited to, evolving India's external technology policy in coordination with domestic stakeholders and in line with India's developmental priorities and national security goals.

It will also help assess foreign policy and international legal implications of new and emerging technologies and technology-based resources, and recommend appropriate foreign policy choice.

Q.15) Which among the following is/are genetic diseases?

1. Haemophilia
2. Down's syndrome
3. Sickle-cell anemia

Select the correct answer using the code given below.

a) 1 only
b) 1 and 2 only
c) 2 and 3 only

d) 1, 2 and 3

Q.15) Solution (d)

All of the given diseases are genetic diseases.

- Hemophilia: In this disease, a single protein that is a part of the cascade of proteins involved in the clotting of blood, is affected. Due to this, in an affected individual, a simple cut will result in non-stop bleeding. The heterozygous female (carrier) for hemophilia may transmit the disease to sons. The possibility of a female becoming hemophilic is extremely rare because the mother of such a female has to be at least carrier and the father should be hemophilic.
- Sickle-cell anemia: This is an autosome linked recessive trait that can be transmitted from parents to the offspring when both the partners are a carrier for the gene (or heterozygous). It results in an abnormality in the oxygen-carrying protein hemoglobin (hemoglobin S) found in red blood cells. This leads to a rigid, sickle-like shape under certain circumstances.
- Down's Syndrome: The cause of this genetic disorder is the presence of an additional copy of chromosome number 21 (trisomy of 21). The affected individual is short-statured with a small round head, furrowed tongue, and partially open mouth. Palm is broad with characteristic palm crease.
- Other examples of genetic disorders are: Klinefelter's Syndrome, Turner's syndrome, Cystic fibrosis, Colour blindness, Phenylketonuria, Thalesemia.

Q.16) Which of the following diseases are caused by viruses?

1. Kala-azar
2. Dengue
3. Tuberculosis
4. Influenza

Select the correct answer using the code given below.

a) 1, 2 and 4 only
b) 2 and 3 only
c) 1 and 3 only
d) 2 and 4 only

Q.16) Solution (d)

Kala-azar (Leishmaniasis) is caused by a protozoa parasite. Sand fly is the vector.

Common viral disease

- Cold cough
- Chicken pox
- Crimean-Congo hemorrhagic fever
- Dengue - mosquito-borne viral infection transmitted by the Aedes mosquitoes. It mainly **affects liver**.
- Japanese encephalitis - mosquito-borne viral disease mainly effecting **liver** of the body
- Jaundice - a viral disease caused by hepatitis C virus which leads to inflammation of **liver** increasing excretion of bilirubin
- AIDS
- Influenza

Common bacterial diseases

- Anthrax - Most forms of the disease are lethal, and it affects mostly animals
- Diphtheria - bacterial infection in the upper respiratory tract.
- Leprosy - Hansen's disease
- Leptospirosis - an infectious bacterial disease occurring in rodents, dogs, and other mammals, which can be transmitted to humans.
- Tuberculosis - bacterial infection which mainly affects lungs
- Cholera
- Typhoid

Q.17) Which of the following statements are correct regarding the Intellectual Property Appellate Board (IPAB)?

1. It is a statutory body established under the provisions of Trade Marks Act, 1999.
2. The Chairman of IPAB should be a retired judge of the Supreme Court.
3. Appeals against the decision of IPAB can only be filed before the Supreme Court.

Select the correct answer using the code given below.

a) 1 and 2 only
b) 2 and 3 only
c) 1 only
d) 1, 2 and 3

Q.17) Solution (c)

The intellectual property Appellate Board (IPAB) was established under section 83 of the Trade Marks Act. It was constituted in 2003 to hear appeals against the decisions of the Registrar under the Trade Marks Act, 1999 and the Geographical Indications of Goods (Registration and Protection) Act, 1999. **Hence, statement 1 is correct.**

The IPAB comprises a chairman (a retired judge of high court) and vice-chairman. In addition, there are three technical members: one for patent and one for trademark; the third member hears the case based on the nature of the dispute. **Hence, statement 2 is not correct.**

The Intellectual Property Appellate Board has its headquarters at Chennai.

As per the sections of the Finance Act 2017, the Intellectual property Appellate Board shall exercise the jurisdiction, powers and authority conferred on it by or under this Copy Right Act, 1957. In view of the same, all the cases pending before the Copy Right Board were transferred to Intellectual Property Appellate Board.

The applicants of all Intellectual Property Rights (IPRs) can directly file a Special Leave Petition (SLP) before the Hon'ble Supreme Court against any order of Intellectual Property Appellate Board (IPAB). They can also prefer a writ petition before the High Court against orders of IPAB and IP offices by invoking Article 226 of the Constitution of India and then file SLP before the Supreme Court. **Hence, statement 3 is not correct.**

Q.18) India is purchasing 'Integrated Air Defence Weapon System (IADWS)' from which of the following nation?

a) The United States of America
b) Russia
c) France
d) Israel

Q.18) Solution (a)

- The US has approved the sale of an Integrated Air Defence Weapon System (IADWS) to India at an estimated cost of $1.9 billion.
- The objective of the deal is to modernize India's armed forces and to expand its existing air defence architecture to counter threats posed by air attacks.

- IADWS will be used along with indigenous, Russian and Israeli systems to erect an ambitious multi-layered missile shield over the National Capital Territory (NCT) of Delhi against aerial threats.
- It comes amidst the massive military modernisation by China which is also flexing its military muscles in the strategic Indo-Pacific region.

Q.19) Which of the following statements is/are correct with regard to Space Activities Bill, 2017?

1. A non-transferable licence shall be provided by the Central Government to any person carrying out commercial space activity.
2. There are provisions for financial subsidy and technical support in terms of designing and launching of satellites to the private sector.
3. The bill sets the target of annual space revenue generation of $10 billion.

Select the correct answer using the code given below:

a) 1 only
b) 1 and 2 only
c) 2 and 3 only
d) All of the above

Q.19) Solution (a)

Features of Space activities bill 2017:

- It is a proposed Bill to promote and regulate the space activities of India.
- The new Bill encourages the participation of non-governmental/private sector agencies in space activities in India under the guidance and authorisation of the government through the Department of Space.
- The provisions of this Act shall apply to every citizen of India and to all sectors engaged in any space activity in India or outside India.
- **A non-transferable licence shall be provided by the Central Government to any person carrying out commercial space activity.**
- The Central Government will formulate the appropriate mechanism for licensing, eligibility criteria, and fees for licence.
- The government will maintain a register of all space objects (any object launched or intended to be launched around the earth) and develop more space activity plans for the country.
- It will provide professional and technical support for commercial space activity and regulate the procedures for conduct and operation of space activity.
- It will ensure safety requirements and supervise the conduct of every space activity of India and investigate any incident or accident in connection with the operation of a space activity.
- It will share details about the pricing of products created by space activity and technology with any person or any agency in a prescribed manner.

- If any person undertakes any commercial space activity without authorisation they shall be punished with imprisonment up to 3 years or fined more than Rs 1 crore or both.

Statement 1 is correct as given above. Statement 2 and 3 are incorrect. There are no such provisions.

Q.20) The India Knowledge Hub (IKH), a dynamic web portal, functioning as a repository to disseminate best practices in various sectors from across the country was launched by –

a) NITI Aayog
b) Ministry of Human Resource Development
c) Ministry of Science and Technology
d) Ministry of Communications and Information Technology

Q.20) Solution (a)

NITI Aayog has created the India Knowledge Hub (IKH), a dynamic web portal, functioning as a repository to store and disseminate best practices from across the country.

Reflecting the spirit of cooperative federalism, the NITI Aayog launched the India Knowledge Hub so that districts, States, Central ministries and other government institutions can exchange knowledge on real-time basis and replicate practices that have worked in other areas.

The portal serves as a dynamic sharing platform in which the key functionaries can directly upload best practices for replication in other regions. While, mostly the best practices are directly uploaded by the district collectors from any State/UT, Departments of State governments and Central Ministry can also upload the best practices in the portal. In its first phase, the portal is also being extended to certain non-government institutions which have requested access to upload best practices.

Q.21) Which of the following organization releases Trade and Development Report (TDR)?

a) WHO
b) UNCTAD
c) UNIDO
d) World Bank

Q.21) Solution (b)

The United Nations Conference on Trade and Development (UNCTAD) releases TDR.

- The Trade and Development Report (TDR), launched in 1981, is issued every year for the annual session of the Trade and Development Board.
- The Report analyses current economic trends and major policy issues of international concern, and makes suggestions for addressing these issues at various levels.

The World Development Report is an annual report published since 1978 by the World Bank.

Q.22) Which of the following statement is/are correct regarding White Label ATM?

1. ATMs set up, owned and operated by non-bank entities are called white label ATMs.
2. These ATMs display the logo of the sponsored bank.
3. TATA launched the first white label ATM in India under the brand name of Indicash.

Select the correct answer using the code given below:

a) 1 only

b) 1 and 3 only

c) 2 and 3 only

d) 1, 2 and 3

Q.22) Solution (b)

White label ATMs

- **ATMs set up, owned and operated by non-bank entities are called white label ATMs.**
- Cash in ATMs is provided by the sponsored bank while ATM machine does not have any branding of Bank.
- **These white label ATMs will not display logo of any particular bank. TATA launched the first white label ATM in India under the brand name of Indicash.**
- The operators are entitled to receive a fee from the banks for the use of ATM resources by the bank's customers and are not permitted to charge bank customer directly.
- These white label Companies have to separately get license/permission from RBI to run business.

Brown Label ATM

- Brown Label ATM are those Automated Teller Machines where hardware and the lease of the ATM machine is owned by a service provider–but cash management and connectivity to banking networks is provided by a sponsor bank .
- The private company owns & operates the ATM machine, pays office rent.
- The bank (which has outsourced this work) provides cash for that ATM.
- ATM has logo of that bank (which has outsourced this work).
- RBI not involved directly. These outsourcing companies have contractual obligation with their respective banks.

➢ Green Label ATM – ATM is provided for Agricultural Transaction

➢ Orange Label ATM – Provided for Share Transactions

➢ Yellow Label ATM – Provided for E-commerce

➢ PINK label ATM – Such ATM are monitored by guards who ensure that only women access these ATM. The sole purpose of such ATM is to mitigate the problem of women standing in long queues of ATM

➢ Biometric ATM – ATMs which uses security features like fingerprint scanner and eye scanner of the customer to access the bank details.

Q.23) With reference *to* Software Technology Parks of India *(STPI)*, Consider the following statements*:*

1. It is an autonomous society under the Ministry of Electronics and Information Technology.
2. The main objective of STPI is the promotion of software exports from the country.
3. STPI in collaboration with Govt. of Telangana, has setup a STPI Semiconductor Measurement Analysis & Reliability Test (SMART) Lab at Hyderabad.

Which of the statements given above is/are correct?

a) 1 and 2 only

b) 2 only

c) 1 and 3 only

d) 1, 2 and 3

Q.23) Solution (a)

- Software Technology Parks of India was set up in 1991 as an **autonomous society under the Ministry of Electronics and Information Technology (MeitY).**
- STPI's main objective has been the **promotion of software exports from the country.**
- STPI in collaboration with Govt. of Karnataka has setup a STPI Semiconductor Measurement Analysis & Reliability Test (SMART) Lab at Bangalore.
- The services rendered by STPI for the software exporting community have been statutory services, data communications services, incubation facilities, training and value added services.
- STPI has played a key developmental role in the promotion of software exports with a special focus on SMEs and startup units.
- STPI has been implementing the Software Technology Park (STP) scheme and the Electronics Hardware Technology Park (EHTP) scheme for the promotion of IT/ITES industry.
- STP Scheme is a unique scheme, designed to promote the software industry and growth of startups and SMEs without any locational constraints.
- STPI has designed and developed state-of-the-art High-Speed Data Communication (HSDC) network called SoftNET for software exporters.
- STPI is the nodal agency for implementation of India BPO Promotion Scheme (IBPS) and North East BPO Promotion scheme (NEBPS) under Digital India Initiative.

Q.24) Which of the following statement is/are correct regarding Aarogya Setu app?

1. The app does not use the GPS feature of smartphones and relies only on the data provided by users to track Covid-19 infection.
2. The government has launched the app in 11 different languages.
3. The mobile app has been developed by the National Informatics Centre (NIC)

Select the correct answer using the code given below:

a) 1 only

b) 1 and 3 only

c) 2 and 3 only

d) 1, 2 and 3

Q.24) Solution (c)

- Aarogya Setu app was launched by the Government of India to track the cases of COVID-19 and alert the citizens of the country to keep safe.
- **It is a COVID-19 tracking app that uses GPS and Bluetooth features of smartphones to track the infection.**
- The government **has launched the app in 11 different languages.**
- The mobile app has **been developed by the National Informatics Centre (NIC**) which comes under the Ministry of Electronics and Information Technology.
- The Government launched this app to connect essential health services with the citizens of India.
- It helps in determining whether the person has been in close contact with any other infected person or not.
- Through Aarogya Setu people will be able to know or track the infection in close vicinity more accurately and effectively.

Q.25) Consider the following statements*:*

1. Craters are formed by the outward explosion of rocks and other materials from a volcano whereas calderas are formed by the inward collapse of a volcano.
2. Craters are also usually much smaller than calderas, only extending to a maximum of one kilometer in diameter.

Which of the statements given above is/are correct?

a) 1 only

b) 2 only

c) Both 1 and 2

d) Neither 1 nor 2

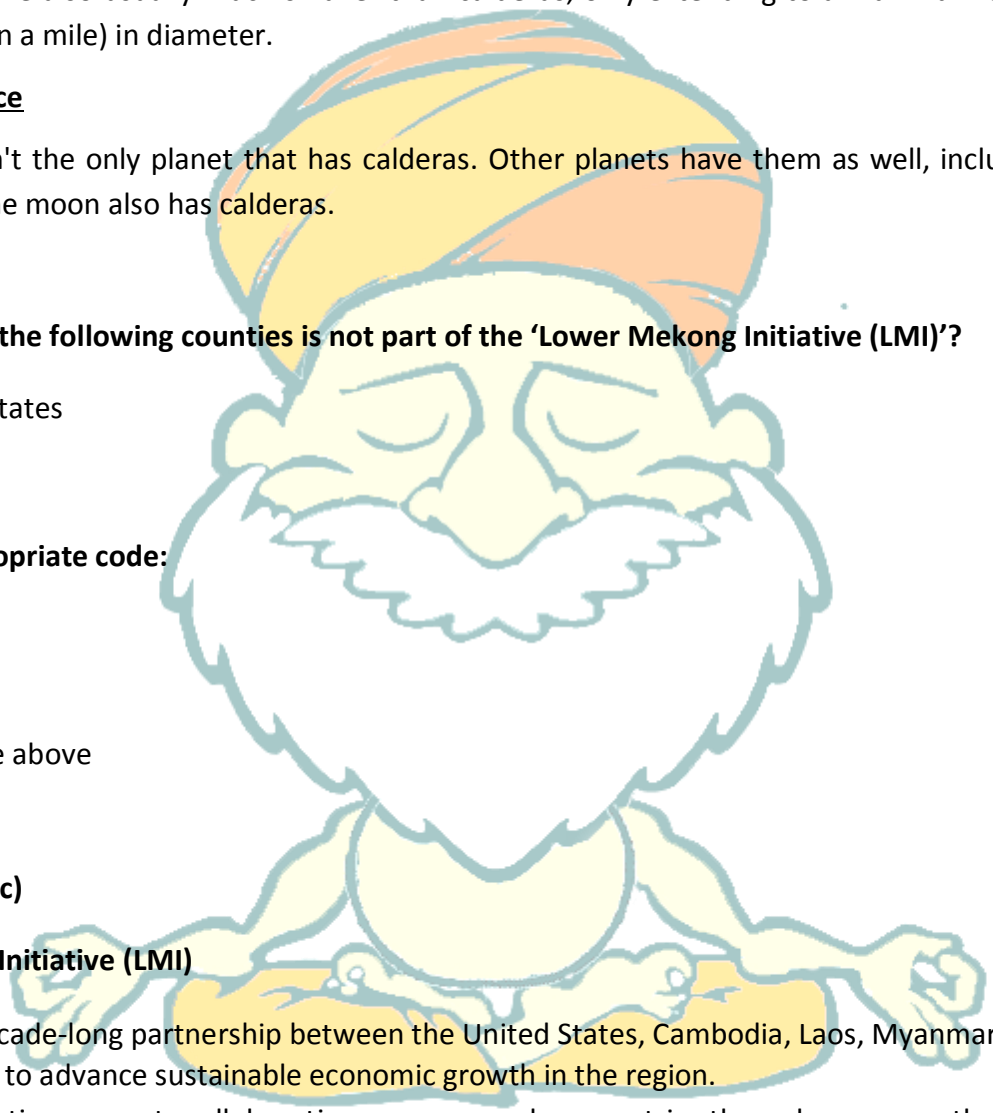
Q.25) Solution (c)

- A caldera is a depression created after a volcano releases the majority of the contents of its magma chamber in an explosive eruption.
- Without any structural support below, the land around the erupting volcanic vent or vents collapses inwardly, creating the bowl-shaped caldera.
- A caldera-causing eruption is the most devastating type of volcanic eruption. It permanently alters the environment of the surrounding area.

- A caldera is not the same thing as a crater.
- Craters are formed by the outward explosion of rocks and other materials from a volcano.
- Calderas are formed by the inward collapse of a volcano.
- Craters are usually more circular than calderas. (Calderas may have parts of their sides missing because land collapses unevenly.)
- Craters are also usually much smaller than calderas, only extending to a maximum of one kilometer (less than a mile) in diameter.

Calderas in Space

- Earth isn't the only planet that has calderas. Other planets have them as well, including Venus and Mars. The moon also has calderas.



Q.26) Which of the following counties is not part of the 'Lower Mekong Initiative (LMI)'?

1. United States
2. China
3. India

Select the appropriate code:

a) 1 and 2
b) 1 and 3
c) 2 and 3
d) All of the above

Q.26) Solution (c)

Lower Mekong Initiative (LMI)

- It is a decade-long partnership between the United States, Cambodia, Laos, Myanmar, Thailand, and Vietnam to advance sustainable economic growth in the region.
- The initiative supports collaboration among member countries through programs that address shared challenges in the region.

Q.27) 'Sustainable Infrastructure Partnership (SIP)' is launched by

a) UN Environment

b) World Economic Forum
c) Bluedot Network
d) Asian Infrastructure and Investment Bank

Q.27) Solution (a)

UN Environment launched the Sustainable Infrastructure Partnership (SIP) in 2018 as a platform to promote and support integrated approaches to sustainable infrastructure planning and development.

Q.28) The "6+2+1" group is mentioned in the news in the context of which of the following issues?

a) South China Sea
b) Peace in Afghanistan
c) ASEAN and RCEP
d) Vulnerability of Island nations due to rising sea levels

Q.28) Solution (b)

"6+2+1" group on regional efforts to support peace in Afghanistan

- It includes six neighbouring countries: China, Iran, Pakistan, Tajikistan, Turkmenistan and Uzbekistan; global players the United States and Russia, and Afghanistan itself.

Q.29) The Ozone hole in the Arctic ozone layer is closed primarily due to

1. Reduced Pollution
2. Weakening of Polar Vortex
3. Weakening of Atlantic Meridional Overturning Circulation (AMOC)

Select the correct statements

a) 1 Only
b) 1 and 2
c) 2 Only
d) 2 and 3

Q.29) Solution (c)

The ozone hole's closing was because of a phenomenon called the polar vortex, and not because of reduced pollution levels due to Covid-19 lockdowns around the world.

Read This - https://www.euronews.com/2020/04/24/largest-ever-hole-in-the-ozone-layer-above-arctic-finally-closes

Q.30) Consider the following statement with respect to 'Cytokines'.

1. Cytokines are proteins produced by the body that sound the alarm when there's an infection.
2. When the cytokines become abundant, it causes intense inflammation.

Select the correct statements

a) 1 Only
b) 2 Only
c) Both 1 and 2
d) Neither 1 nor 2

Q.30) Solution (c)

What's referred to as a "cytokine storm" is a severe immune response to an infection. Cytokines are proteins produced by the body that sound the alarm when there's an infection. This is generally helpful to ward off illness. Cytokines are also responsible for some of the pro-inflammatory symptoms we feel when sick, like fever.

When the body encounters a new virus and doesn't know how to react, the immune system can go haywire, produce higher levels of cytokines and cause intense inflammation.

Hyper-inflammation can cause severe damage to the lungs, where the body is primarily fighting the virus. However, the virus infects cells all over the body. Inflammation can also cause hyper-coagulation, leading to troublesome blood clots